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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/575,041	02/22/2007	Kenichi Adachi	545/72	5951

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EXAMINER	
TRAN, VINCENT HUY	
ART UNIT	PAPER NUMBER
2115	

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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/575,041	ADACHI ET AL.	
	Examiner	Art Unit	
	VINCENT T. TRAN	2115	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *22 February 2007*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-35* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-35* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *05 May 2006* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date *1/15/08, 10/18/07, 2/13/07, 12/28/06, 5/19/06, 4/5/06*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

1. This Office Action is responsive to the communication filed on 2/22/07.

2. Claims 1-35 are pending for examination.

Claim Rejections - 35 USC § 101

35 U.S.C. 101 reads as follows:

> Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

3. Claims 30, 35 are rejected under 35 U.S.C. 101 because the claimed invention is directed to non-statutory subject matter. The claims recite "a processor control program" are clearly direct toward a software program.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (a) the invention was known or used by others in this country, or patented or described in a printed publication in this or a foreign country, before the invention thereof by the applicant for a patent.
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

4. Claims 1-2, 4, 9-10, 12, 16-17, 19, 21-22, 24 are rejected under 35 U.S.C. 102(b) as being anticipated by Luick US Pub No. 20030229662.

5. As per claim 1, Luick discloses a method of controlling a processor [20 fig. 2] comprising switching a plurality of processing blocks [processor 0…3] formed inside a processor in accordance with a temperature [paragraph 0060-0061, 0089, 0094, 0099].

6. As per claim 2, Luick discloses switching a combination of parallel availability and operating frequency in accordance with a temperature of the processor [paragraph 0094].

7. As per claim 4, Luick discloses allocating tasks to at least a processing block having a lowest temperature among the plurality of processing block [paragraph 0062].

8. As per claim 9, Luick discloses a processor [30A fig. 3] comprising:

a plurality of processing blocks [20As or 10As];

a sensor which measures a temperature [41B]; and

a control unit [71] which switches parallel availability of the plurality of processing blocks in accordance with the measured temperature [see discussion in claim 1].

9. As per claims 10, 12, they are substantially directed to the system set forth in claims 2, 4 and therefore are rejected under the same basic.

10. As per claims 16, 17, 19, 21, 22, 24, they are substantially directed to the system set forth in claims 1-2, 4 and therefore are rejected under the same basic.

11. Claims 13-15, 20, 25-26, 28-29, 35 are rejected under 35 U.S.C. 102(b) as being anticipated by Hirai et al. (Hereafter "Hirai") WO 03083693 (see translation in US Pub. No. 20050278520).

12. As per claim 13, Hirai discloses a processor [1] comprising:

a plurality of processing blocks [P1…Pn];

a table [fig. 2] which describes combinations of parallel availability of the plurality of processing blocks [paragraph 0014-0015] and operating frequency [*paragraph 0030 - numerical values representing performance such as number of instructions executed per unit time*]; and

a control unit [Processor Pi] which consults the table and switches between the combinations as appropriate [paragraph 0037-0039].

13. As per claim 14, Hirai discloses the table describes processing performance for each of the combinations [paragraph 0030].

14. As per claim 15, Hirai discloses when the processor is predicted to exceed or exceeds a predetermined threshold in temperature, the control unit selects a combination yielding a smaller amount of heat generation than at present out of the combinations, and switches to the combination selected [paragraph 0047, 0065].

15. As per claim 20 and 25, it is substantially directed to the system set forth in claims 13 and therefore are rejected under the same basic.

16. As per claim 26, Hirai discloses switching parallel availability of a plurality of processing blocks formed inside a processor in accordance with a temperature [paragraph 0014].

17. As per claim 28, Hirai discloses allocating tasks in consideration of the number of the plurality of processing blocks available in parallel, the number being determined task by task [*paragraph 0014 – the task scheduling includes memory storing characteristic values of the tasks related to the degree of temperature rises in each processing unit caused by the execution of each task on a task by task basis*].

18. As per claim 29, Hirai discloses allocating tasks to at least a processing block having a lowest temperature among the plurality of processing blocks [paragraph 0065].

19. As per claim 35, see discussion in claim 29.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

The factual inquiries set forth in *Graham* **v.** *John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

20. Claims 3, 11, 18, 23, 31-34 are rejected under 35 U.S.C. 103(a) as being unpatentable over Luick as applied to claim 1 or 9 or 16 or 21 above, and further in view of Guo et al. US Pub No. 20050071843 ("Guo").

21. As per claim 3, Luick teaches allocating task in consideration of the number of the plurality of processing blocks available [*paragraph 0062, 0090-0091, 0099 and fig. 14 – finds a set of processor with high affinity but which are unutilized, unused, or gone the longest without*

encountering a hot spot]. However, Luick fails to teach the number being determined task by task.

Guo teaches another system and method for scheduling jobs in a multiprocessor machine. Specifically, Guo teaches allocating tasks in consideration of the number of the plurality of processing blocks available in parallel, the number being determined task by task [*paragraph 0021, 0060-0061, 0081, 0093 – based on task by task, each task define the resource requirement (number of processor), the scheduler provides a list of best available resource (number of available processor)*].

At the time of the invention was made, it would have been obvious to one of ordinary skill in the art to have modified the system of Luick with the number of available processing block being determined task by task of Guo. The motivation for doing so would have been, as taught by Guo, to avoid a task being poorly allocated and adversely affecting the operating efficiency of the system.

22. As per claim 11, 18, 23, see discussion in claim 3.

23. As per claim 31-34, see discussion in claim 4.

24. Claims 5-8, 30 are rejected under 35 U.S.C. 103(a) as being unpatentable over Luick in view of Chauvel et al. U.S. Patent No. 7,062,304 ("Chauvel").

25. As per claim 5, Luick discloses a method of controlling a processor comprising **switching** between combination of parallel availability of a plurality of processing blocks formed inside a processor [*see discussion in claim 1*] and an operating frequency [*paragraph 0094-when processors are not available*] by consulting a table [*73 – hot processor registers table*].

In summary, Luick teaches the operating system 71 consulting a table [73] which store information about which processors have reported hot spots and which has not. Based on the information, the operating system 71 determines whether the task should be switched, swapped, or operating the task at a slower frequency.

Luick does not teach a predetermined table. In other word, Luick does not teach consulting a table to determined the characteristic of the processors.

Chauvel teaches another method for managing energy and heat in a multiprocessor system [as show in fig. 1]. Specifically, Chauvel teaches a scheduler to evaluates the upcoming application and slits it into a tasks list where the task list is used to generate a scenario in which the scenario is used to allocate the various tasks to the modules [14, 16, 12]. This scenario takes into account the characteristics of the hardware on which the tasks will be implemented, for example, the sized of the caches, the width of various buses....the clock speeds used in the module, effective frequency [col. 5 line 50 to col. 6 line 43] to ensure that temperature thresholds are not exceeded in any area of the device [col. 8 lines 6-28].

At the time of the invention was made, it would have been obvious to one of ordinary skill in the art to have modified the method of Luick with the consulting the predetermined table by takes into account the characteristics of the various modules of Chauvel. The motivation for doing so would have been to provide the system with an accurate profile of the hardware that would use for scheduling tasks in the most thermal and energy efficient manner.

26. As per claim 6, Chauvel teaches the table describes processing performance for each of the combination [*values for effective frequency of each module*].

27. As per claim 7, Chauvel teaches when the processor is predicted to exceed or exceeds a predetermined threshold in temperature, a combination yielding a smaller amount of heat generation than that of a combination selected currently is detected out of the combinations, so that the combination selected currently is switched to the combination detected [col. 4 lines 52-58].

28. As per claim 8, Chauvel teaches selecting currently is switched to a combination yielding maximum performance [col. 6 lines 3-7].

29. As per claim 30, it is substantially directed to the system set forth in claims 5 and therefore are rejected under the same basic.

30. Claim 27 is rejected under 35 U.S.C. 103(a) as being unpatentable over Hirai as applied to claims 25-26 above, and further in view of Luick.

31. As per claim 27, Hirai teaches switching a combination of the parallel availability in accordance with a temperature of the processor. Hirai does not teach switching the operating frequency in accordance with a temperature.

Luick teaches another method for eliminating hot spots on processor chips in symmetric multiprocessor. Specifically, Luick teaches switching the operating frequency in accordance with a temperature [paragraph 0094].

At the time of the invention was made, it would have been obvious to one of ordinary skill in the art to have modified the system of Hirai with the switching the operating frequency in accordance with a temperature of Luick in order to reduce the temperature of the processor.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to VINCENT T. TRAN whose telephone number is (571)272-7210. The examiner can normally be reached on 7:30-5:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Thomas c. Lee can be reached on (57 1)272-3667. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Vincent T Tran/
Examiner, Art Unit 2115